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Fiscal Multiplier Determinants in the CESEE Region[1]

Abstract

In this paper we use the panel VAR model with exogenous variables to analyse the effects of various structural characteristics of the economies on the effectiveness of government consumption in the Central Eastern and Southeastern European region (CESEE). More precisely, we analyse the effects of government consumption on economic growth in this region, controlling for the effects of the size of the economy, level of public debt, level of tax burden, openness of the economy, rigidity of the labour market, monetary regime and the phase of the business cycle. Our results indicate that these characteristics have a significant impact on the effectiveness of fiscal policy (in terms of the size of the fiscal multiplier). Also, these effects are in line with the theoretical assumptions as the recessionary phase of the cycle, size of the economy, rigidity of the labour market and the fixed exchange rate

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regime increase the average size of fiscal multipliers while tax burden, indebtedness and openness of the economies reduce the size of the fiscal multiplier, when compared to the base model.

Keywords: fiscal multipliers, CESEE region, panel VAR
JEL Codes: E60, E62, C23

1. Introduction

The importance and possibilities of fiscal policy were neglected by the academia and by the policy makers for decades after the revolution of macroeconomics in the 1970/80 s. However, the Great Recession, euro zone crisis and prolonged recession in many European economies have put fiscal policy, especially its stabilization role, in the middle of expert and public discussions again recently. The role of fiscal policy is especially important in the countries which are characterized by the high share of the government sector in the economy and whose monetary policy is limited by various structural characteristics of the economy and financial system, which make fiscal policy the main economic policy channel and lever. Exactly these characteristics typify most of the countries in the Central Eastern and Southeastern European (CESEE) region, which makes this region convenient for the analysis of the effectiveness of fiscal policy.

Thus, in this paper we conduct an empirical analysis of the effects of government consumption on the economic growth through the concept and size of the fiscal multiplier in eleven selected CESEE countries, namely Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia and Slovenia. However, the aim of this paper is not only to estimate the size and a sign of fiscal multiplier in selected CESEE countries, but also to analyse the determinants of its size, based on various characteristics of the selected economies: the size of the economy, level of public debt, level of tax burden, openness of the economy, rigidity of the labour market, monetary regime and the phase of the business cycle.

Our methodological approach relies on the panel VAR analysis, with the introduction of exogenous "control" variables, which allows us to: (i) estimate the size of the fiscal multiplier in the panel framework and (ii) to analyse the effect of aforementioned determinants on the size of the fiscal multiplier, i.e. on the effectiveness

of government consumption. Our sample covers eleven economies and ten years (2006-2015), which gives us a relatively small, but still acceptable sample size[2].

The paper is structured as follows. After the introduction in the second part of the paper we present a literature overview, mostly focusing on the panel VAR approaches. In the third part we briefly present our methodological approach and data, which is followed by the discussion of the results in the fourth part of the paper. In the last part of the paper we present the concluding remarks.

2. Literature Review

Following the empirical approach employed in the paper, the literature review is focused mainly on papers using the panel VAR and SVAR methodology in analysing the determinants of fiscal multipliers. Table 1 gives a brief literature overview on determinants of government consumption multipliers. Most of the reviewed literature is based on a heterogeneous sample of countries, including both advanced and emerging economies. Very few papers estimate fiscal multipliers and their determinants for emerging economies only.

Starting with the level of public debt, the theory indicates that a higher government debt-to-GDP ratio decreases the government consumption multiplier due to a higher risk premium and a decrease in private sector confidence which is consequently de-stimulating consumption and investment. This determinant is often accounted for in the empirical literature, which generally confirms the theory (Ilzetzki et al., 2013[3]; Hory, 2016[4]; Deskar-Škrbić and Šimović, 2015[5]).

[2] Our sample is determined by data availability and comparability of the countries.

[3] E. Ilzetzki, E. Mendoza, & C. Végh, *How big (small?) are fiscal multipliers?,* "Journal of Monetary Economics" 2013, 60(2), pp. 239–254.

[4] M.-P. Hory, *Fiscal multipliers in Emerging Market Economies: Can we learn something from Advanced Economies' experiences,* "International Economics" 2016, 146(2016), pp. 59–84.

[5] M. Deskar-Škrbić, & H. Šimović, *The size and determinants of fiscal multipliers in Western Balkans: comparing Croatia, Slovenia and Serbia*. EFZG Working Paper Series 2015, pp. 15–10.

Table 1. Determinants of the size of fiscal multipliers

Determinants	Authors	Country	Time period	Methodology	Results
Level of public debt	Ilzetzki et al. (2013)	44 EMEs and AEs	1960Q1–2007Q4	Panel SVAR	A higher government debt-to-GDP ratio decreases consumption multipliers
	Hory (2016)	48 EMEs and AEs	1990Q1-2013Q4	PVAR	
	Deskar-Škrbić and Šimović (2015)	Croatia, Serbia Slovenia	2001Q1-2014Q1 (Croatia, Slovenia) and 2003Q1-2014Q1 (Serbia)	SVAR Blanchard &Perotti (2002)	
	Contreras Banco and Battelle (2014)	55 EMEs and AEs	1988Q1-2010Q4	GMM estimator, panel SVAR model	Government consumption multiplier equal to zero in high-debt countries
Trade openness	Ilzetzki et al. (2013)	44 EMEs & AEs	1960Q1–2007Q4	Panel SVAR	Trade openness reduces the government consumption multiplier
	Kraay (2013)	102 EMEs and AEs	1970–2010	OLS, 2SLS, and first-stage regressions	
	Silva et al. (2013)	Euro area	1998–2008	PVAR	
	OECD (2009)				
	Deskar-Škrbić et al. (2014)	Croatia	2000Q1–2012Q2	SVAR Blanchard &Perotti (2002)	
	Deskar-Škrbić and Šimović (2015)	Croatia, Serbia Slovenia	2001Q1-2014Q1 (Croatia, Slovenia) and 2003Q1-2014Q1 (Serbia)	SVAR Blanchard &Perotti (2002)	
Labour market rigidity	Cole and Ohanian (2004)	US		DSE	Labour market rigidities increase FM (if imply wage rigidities)
	Gorodnichenko et al. (2012)	Finland		DSGE	
Business cycle phase	Kraay (2013)	102 EMEs and AEs	1970–2010	OLS, 2SLS, and first-stage regressions	Government consumption multipliers are higher in recessions
	Silva et al. (2013)	Euro area	1998–2008	Panel-data VAR approach	
	Corsetti et al. (2012)	17 OECD countries:	1975–2008	PVAR	
	GrdovićGnip (2014)	Croatia	1996Q1-2011Q4	SVAR Blanchard &Perotti (2002); STVAR Auerbach&Gorodnichenko (2010)	
	Muir and Weber (2013)	Bulgaria	1999Q1–2011Q4		

Exchange rate regime	Ilzetzki et al. (2013)	44 EMEs & AEs	1960Q1–2007Q4	Panel SVAR	Government consumption multipliers are higher in the fixed exchange rate regime
	Kraay (2013)	102 EMEs and AEs	1970–2010	OLS, 2SLS, and first-stage regressions	Government consumption multiplier is larger in the flexible exchange rate regime
	Contreras Banco and Battelle (2014)	55 EMEs and AEs	1988Q1-2010Q4	GMM estimator, panel SVAR model	Government consumption multiplier equals to zero in the flexible exchange rate regime
Development	Ilzetzki et al. (2013)	44 EMEs & AEs	1960Q1–2007Q4	Panel SVAR	Government consumption multipliers higher in AEs
	Hory (2016)	48 EMEs and AEs	1990Q1-2013Q4	PVAR	
	Kraay (2013)	102 EMEs and AEs	1970–2010	OLS, 2SLS, and first-stage regressions	
	Contreras Banco and Battelle (2014)	55 EMEs and AEs	1988Q1-2010Q4	GMM estimator, panel SVAR	Positive and larger government consumption multiplier in developing than in high-income countries

Source: the authors' elaboration.

When it comes to trade openness, another determinant broadly observed, especially for small open economies, the theory suggests that countries more open to trade have a lower government consumption multiplier due to outflow effects. The surveyed empirical literature is in line with the previous hypothesis (Ilzetzki et al., 2013[6]; Kraay, 2013[7]; Silva et al., 2013[8]; Deskar-Škrbić et al., 2014; Deskar-Škrbić and Šimović, 2015[9]).

Regarding labour market rigidity, theory suggests that a more rigid labour market is less responsive to economic movements, thus reduces the effectiveness of fiscal policy. Cole and Ohanian (2004)[10] and Gorodnichenko et al. (2012)[11] find that labour market rigidities increase FM.

Another determinant of the multiplier size often investigated in empirical literature is the business cycle phase. The reviewed papers (Kraay, 2013[12]; Silva et al., 2013[13]; Corsetti et al., 2012[14]; Grdović Gnip, 2014[15]) confirm that government consumption multipliers are higher in recessions.

The reviewed literature on the exchange rate regime is ambiguous. Ilzetzki et al. (2013) [16] find that government consumption multipliers are higher in the fixed exchange rate regime while Kraay (2013) [17] claims that the government consumption multiplier is larger in the flexible exchange rate regime. On the other hand, Contreras Banco and Battelle (2014) [18] find that the government consumption multiplier is equal to zero in the flexible exchange rate regime.

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[6] Ilzetzki et al., op.cit.

[7] A. Kraay, *Government consumption multipliers in developing countries: evidence from lending by official creditors*, World Bank Policy Research Working Paper 2013, No. 6099.

[8] R. Silva, V.M. Carvalho, & A.P. Ribeiro, *How Large are Fiscal Multipliers? A Panel Data VAR Approach for the Euro Area*, FEP Working Papers 2013, No. 500 August 2013.

[9] Deskar-Škrbić et al., op.cit.

[10] H. Cole, & L. Ohanian, *New Deal Policies and the Persistence of the Great Depression: A General Equilibrium Analysis*, "Journal of Political Economy" 2004, 112 (August), pp. 779–816.

[11] Y. Gorodnichenko, E.G. Mendoza, & L. Tesar, *The Finnish Great Depression: From Russia with Love,* "American Economic Review" 2012, 102(4), pp. 1619–1643.

[12] A. Kraay, op.cit.

[13] Silva et al., op.cit.

[14] G. Corsetti, A. Meier, & G.J. Müller, *What Determines Government Consumption Multipliers?,* IMF Working Paper, Monetary and Capital Markets Department 2012, WP/12/150.

[15] A. Grdović Gnip, *The power of fiscal multiplier in Croatia,* "Financial Theory and Practice" 2014, 38(2), pp. 173–219.

[16] Ilzetzki et al., op.cit.

[17] A. Kraay, op.cit.

[18] J. Contreras Banco, & H. Battelle, *Fiscal Multipliers in a Panel of Countries,* Banco de México Working Papers 2014, No. 2014–15.

Finally, regarding the level of development, Ilzetzki et al. (2013)[19], Hory (2016)[20] Kraay (2013)[21] confirm that government consumption multipliers are higher in AEs while Contreras Banco and Battelle (2014)[22] obtain a positive and larger government consumption multiplier in developing than in high-income countries.

3. Methodology and Data

As shown in the literature review, when assessing the effects of government consumption, most authors look through the lens of fiscal multipliers. The fiscal multiplier is the ratio in which the change in a country's GDP is affected by government spending. The fiscal multiplier is used to measure the effect of government consumption (fiscal policy) on the subsequent level of that country. In theory, increased fiscal spending can lead to increased consumption, which then leads to a cycle of consumption and wealth creation (for more details on the fiscal multipliers see Šimović, H. & Deskar-Škrbić, M. (2013)[23]).

We can divide fiscal multipliers in two main categories. The first category is the impact multiplier which measures the effect of government consumption on GDP in the first period after the shock. The second category is the cumulative multiplier which can be defined as the sum of multipliers in each period after the shock. The calculation of these multipliers is based on Equation 1 (a) and (b):

(a) Impact multiplier

$$M = \frac{\Delta Y(t)}{\Delta G(t)}$$

(b) Cumulative multiplier

$$M = \frac{\sum_{j=0}^{N} \Delta Y(t+j)}{\sum_{j=0}^{N} \Delta G(t+j)} \quad (1)$$

As already stated above, our methodological approach is based on the panel vector autoregression with the exogenous variables framework. Thus, our model takes the following form:

$$Y_{it} = \beta(L) Y_{it-1} + \gamma X_{it} + \varepsilon_{it} \quad (2)$$

[19] Ilzetzki et al., op.cit.
[20] M.-P. Hory, op.cit.
[21] A. Kraay, op.cit.
[22] J. Conteras Banco et al., op.cit.
[23] H. Šimović & M. Deskar-Škrbić, *Dynamic Effects of Fiscal Policy and Fiscal Multipliers in Croatia*, Proceedings of Rijeka Faculty of Economics, "Journal of Economics and Business" 2013, 31(1), pp. 55–78.

where $\beta(L)$ is matrix polynominals in the lag operator L, γ coeficients of exogenous variables, the country pair index is i, the time index is $t = 1, 2, ...T$ and ε_{it} is the vector of errors. The endogenous variables vector Y_{it} comprises the real annual change in GDP and the real annual change in government consumption, defined as the final government expenditure in national accounts. Depending on the estimated model, vector X_{it} includes one of seven "control" variables: the size of the economy, level of public debt, level of tax burden, openness of the economy, rigidity of the labour market, monetary regime and the phase of the business cycle. The analysis is based on the sample of eleven economies (Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia and Slovenia) in the 2006–2015 time period. Table 2 presents the main characteristics of the variables included in the analysis.

Table 2. Variable list and explanations

Variables		Characteristics	Source
Endogenous variables (Y_{it})	GDP	Real growth rate	Eurostat; national statistical offices
	Government consumption	Real growth rate	Eurostat; national statistical offices
Exogenous (X_{it})	Public debt	Share of GDP	Eurostat; national ministries of finance
	Openness	Share of GDP (sum of imports and exports)	Eurostat; national statistical offices
	Size	Population (in m)	World bank
	Tax burden	Share of GDP (tax revenues)	Eurostat; national ministries of finance
	Labour market rigidity	Labour market flexibility score	Global Competitiveness Report Database
Exogenous (dummy) (X_{it})	Business cycle	Recession = 1	Eurostat; national statistical offices
	Monetary regime	Eurozone/fixed = 1	ECB; national central banks

Source: the authors' elaboration.

Endogenous variables are defined as an annual percentage change of gross domestic product (GDP) and final consumption expenditure of general government in 2010 constant prices, in millions of euros. Exogenous, non-binary, variables are public debt expressed as a percentage of GDP, openness of the economy, defined as a sum of imports and exports and expressed as a percentage of GDP, population in millions of citizens, tax burden defined as a share of tax revenues in GDP and labour market rigidity defined through the indicator of labour market flexibility (1-7) in the

Global Competitiveness Report Database[24]. We also included two binary exogenous variables. The first variable, the business cycle dummy, is constructed in a way that it takes the value of 1 if the country of interest recorded a negative real GDP change in a particular year and 0 otherwise. The second dummy variable takes the value of 1 if the country is a member of the euro zone (Slovenia and Slovakia), unilaterally adopted the euro (Montenegro) or has the fixed exchange rate regime (Macedonia).

Before the presentation of the obtained results it is important to explain the expected effects of the included exogenous variables on the size of fiscal multipliers, i.e. the effectiveness of fiscal consumption. Following Batini et al. (2014)[25], we can divide our determinants in two groups, structural and conjectural.

Starting with the structural determinants:

(i) a high degree of *trade openness* reduces the size of the fiscal multiplier through the "outflow effects" of the imports;
(ii) countries with more rigid *labour markets* have larger fiscal multipliers since rigid wages tend to amplify the response of output to demand shocks;
(iii) countries that have the *flexible exchange rate* regime have lower fiscal multipliers because effects of fiscal policy on their domestic economy are limited by the effects on international flows;
(iv) countries with high levels of *public debt* have lower fiscal multipliers because an additional fiscal expansion can lead to an increase in the risk premium and a decrease in private sector confidence, thus de-stimulating consumption and investment;
(v) countries with a higher *tax burden* tend to have lower fiscal multipliers as the fiscal capacity of a country is limited and there is a stronger possibility of the prevalence of Ricardian households, and finally
(vi) large economies have *large domestic markets,* so the multiplicative effects of fiscal policy are stronger.

As for the conjectural determinants, as already mentioned, fiscal policy is more effective in conjectures than in the expansionary phase of the business cycle.

The summary of this discussion is given in Table 3:

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[24] In this paper we inverted the scale meaning that a higher value of the indicator points to the more rigid labour market.

[25] Batini, N., Eyraud, L. & Weber, A., *A Simple Method to Compute Fiscal Multipliers*, IMF Working Paper 2014., 14/93, Washington: International Monetary Fund.
Although we follow Batini et al. (2014), the determinants selected in this paper slightly differ as we included the level of tax burden and the size of the economy but we do not assess the effects of automatic stabilizers and ZLB.

Table 3. Determinants of the size of fiscal multipliers and their expected effect

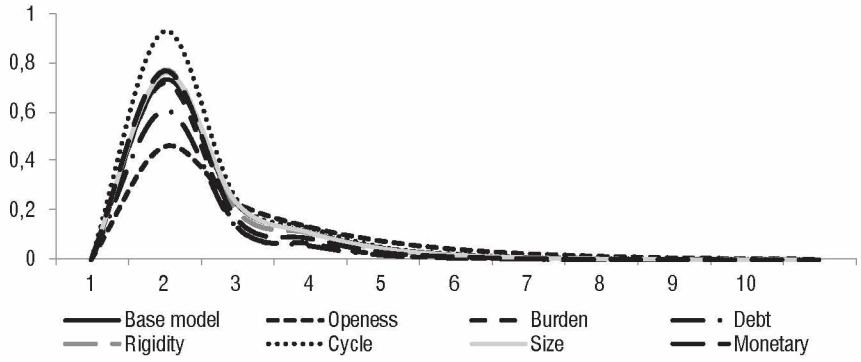
Determinant	Expected effect on the size of fiscal multiplier
Public debt	-
Openness	-
Size	+
Tax burden	-
Labour market rigidity	+
Fixed exchange rate	+
Recession	+

Source: the authors' elaboration.

4. Results

The most common approach in the presentation of VAR-based results are impulse responses (IRFs). Thus, in Figure 1 we present the impulse responses functions of each estimated model, which gives us the total of eight models – the baseline model (without control, exogenous variables) and seven models including each of the aforementioned exogenous variables.

Figure 1. Impulse response of real GDP growth to the shock in government consumption



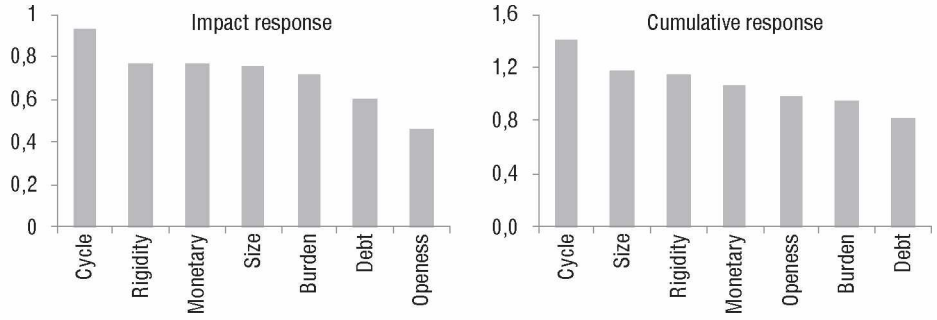
Note: The X-axis shows the number of periods after the shock and y-axis shows the size of the impulse (in pp).
Source: the authors' elaboration.

The estimation of the base model suggests that the average size of the fiscal multiplier in selected CESEE countries in the first year after the shock is 0.8, which is in line with the conclusions of the fiscal multiplier literature for individual countries

in the sample (see Appendix 1). When compared to the baseline results we can see that the introduction of the business cycle dummy, monetary regime dummy, size and rigidity increase the size of the fiscal multiplier, while trade openness, tax burden and a high level of public debt decrease the size of the fiscal multiplier, in line with the assumptions presented in Table 3.

To get a clearer view on the size of fiscal multipliers, in Figure 2 we present the impact and the cumulative multipliers, ordered by the size of the multiplier, given the corresponding determinant.

Figure 2. Size of impact and cumulative multipliers



Source: the authors' elaboration.

Looking at the cumulative responses (which can be seen as the total effect of fiscal consumption) we can conclude that recessions lead to the largest multipliers, followed by the size of the economy and the rigidity of the labour market. On the other hand, tax burden and indebtedness lead to a notable reduction in the effectiveness of fiscal policy. These results are in line with theoretical assumptions and the existing literature indicating that they are robust.

5. Conclusion

The results presented in this paper indicate that fiscal policy is an important growth determinant in the CESEE region as the increase in government consumption has a positive and relatively strong (the fiscal multiplier around 0.8) effect on economic growth. Such a result fits well to our discussion in the Introduction, where we pointed out that fiscal policy is especially important in countries whose monetary policy is constrained and in which government holds a large chunk of the economy; the characteristics of which are strongly related to the countries included in this analysis. In

addition, our results confirmed the theoretical assumptions and expert view on the effects of various structural characteristics of the countries on the effectiveness of fiscal consumption. More precisely, our analysis showed that countries that face a recession, which are larger, which have a more rigid labour market and have the fixed exchange rate (or are a member of a monetary union) tend to have larger multipliers. On the other hand, the effectiveness of fiscal policy is limited in highly open economies, economies with a high public debt level and economies with a high tax burden.

Our conclusions have some policy implications, as in our view fiscal policy makers should take all these determinants into account when making policy proposals and defining the main policy instruments. Large fiscal packages aimed at the stabilization of the domestic economy could be "wasted" if countries are characterized by the determinants that significantly reduce the size of fiscal multipliers. In that case policy makers should look beyond the traditional fiscal measures. On the other hand, some policy makers are faced with strong opposition when proposing a fiscal stimulus, but if they stress that all determinants are favorable and that the empirical and theoretical literature suggest that the proposed stimulus could be effective, critics could become more benevolent. Finally, all the discussions related to changes in fiscal consumption and/or tax policy should be founded on a systemic analysis and not so-called "fiscal alchemy".

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Appendix

Table A1. Short term government consumption multipliers in 11 CEE economies

Country	Authors	Time period	Methodology and identification method	Short term government consumption multiplier
Bulgaria	Mulr and Weber (2013)	1999Q1–2011Q4	SVAR, Blanchard & Perotti (2002)	Insignificant
		2003M1–2006M12	SVAR, Blanchard & Perotti (2002)	0.16
			GIMF	0.51
	Karagyozova-Markova et al. (2013)	1999 Q1–2011Q3	VAR, recursive identification	0.17
			SVAR, Blanchard &Perotti (2002)	0.41
			TVP-VAR	0.3–0.15 (higher in recessions)
Czech Republic	Franta (2012)	1999Q1–2011Q3	VAR, recursive identification	0.32
			VAR, sign restrictions	1.43
	Klyuev and Snudden (2011)		GIMF	0.41
	Ambriško et al. (2013)	1996Q1-2011Q4	Structural DSGE	0.21
	Babecký et al. (2016)	1996Q1-2011Q4	DSGE-VAR	0.90
			DSGE	0.42
	OECD (2009)		DSGE	0.3
	Crespo Cuaresma et al. (2011)		SVAR Blanchard & Perotti (2002)	–0.01
Croatia	Šimović and Deskar-Škrbić (2013)	2004Q1-2012Q4	SVAR Blanchard & Perotti (2002)	General level 2.18 Central consolidated level 1.58 Central level 0.82
	GrdovićGnip (2015)	1996Q1-2011Q4	SVAR Blanchard & Perotti (2002)	2.45
	Deskar-Škrbić and Šimović (2015)	2001Q1-2014Q1	SVAR Blanchard & Perotti (2002)	0.80
Hungary	OECD (2009)		DSGE	0.3
	Crespo Cuaresma et al. (2011)	1995Q1–2009Q4	SVAR Blanchard & Perotti (2002)	0.02

Country	Authors	Time period	Methodology and identification method	Short term government consumption multiplier
Macedonia	Filipovski et al. (2016)	2000Q1–2011Q4	recursive VAR-model adjusted Blanchard & Perotti (2002)	–0.29816
Montenegro	-	-	-	-
Poland	OECD (2009)		DSGE	0.4
	Crespo Cuaresma et al. (2011)	1995Q1–2009Q4	SVAR Blanchard & Perotti (2002)	–0.01
Romania	Stoian (2012)	2000Q1–2011Q3	VAR, Blanchard and Perotti (2002), IV estimator	0.57
	Boiciuc (2015)	2000Q1–2012Q4	Recursive VAR model	0.1
Serbia	Hinić et al. (2013)	n.a.	SVAR Blanchard & Perotti (2002)	0.77
	Deskar-Škrbić and Šimović (2015)	2003Q1–2014Q1	SVAR Blanchard & Perotti (2002)	0.37 (insignificant)
Slovakia	Zeman (2016)	1999Q1–2007Q4	**DSGE**	0.55
	OECD (2009)		DSGE	0.3
	Crespo Cuaresma et al. (2011)	1995Q1–2009Q4	SVAR Blanchard & Perotti (2002)	–0.01
Slovenia	Crespo Cuaresma et al. (2011)	1995Q1–2009Q4	SVAR Blanchard & Perotti (2002)	0.00
	Deskar-Škrbić and Šimović (2015)	2001Q1–2014Q1	SVAR Blanchard & Perotti (2002)	–0.53
	Jemec et al. (2013)	1995Q1–2010Q4	**SVAR** Blanchard & Perotti (2002)	1.61

Source: the authors' elaboration.